B.E. (with Credits)-Regular-Semester 2012-Instrumentation Engineering Sem V

IN501 - Process Automation

P. Pages : 2 **GUG/W/16/3787**

Time : Three Hours * 3 9 8 2 * Max. Marks : 80

Notes : 1. Same answer book must be used for each section.
2. All questions carry marks as indicated.
3. Assume suitable data wherever necessary.
4. Illustrate your answers wherever necessary with the help of neat sketches.

1. a) Define the following : **8**
i) Process
ii) Process variable
iii) Dead time
iv) Single and multi capacity process
v) Self and non-self regulating process.

b) What is the need of mathematical modelling ? Give mathematical model of thermal systems. **8**

OR

2. a) Define process time constant. And explain the methods for finding time constant & dead time. **8**

b) Write a note on evolution of automation in industries & its benefits. **8**

3. a) Why derivative controller can not used alone ? Draw and explain PID controller. **8**

b) Write a note on integral windup and prevention. **8**

OR

4. a) What is meant by controller tunning? Explain the different controller tunning methods. **16**

5. a) Describe split range control. **8**

b) Describe cascade control when it gives improved performance them conventional feedback control. **8**

OR

6. a) Explain the implementation of ratio control for a blending process. **8**

b) Demonstrate the concept of feed-forward control with the help of block diagram. **8**

7. a) What is scan time of PLC ? Explain its importance in process control. **6**

b) Explain PLC timer and counter instructions with their functions. **10**

OR

8. a) List application of SCADA. Explain any one in detail. **6**

b) Prepare PLC ladder diagram for Stirred Tank Heater for the given sequence of process. **10**

i) Fill the tank upto high limit.
ii) Heat and stir the liquid for 20 min.
iii) Empty the tank upto low limit
iv) Repeat from step - 1.

The hardware has the following types of switches.

i) Start PB in "NO", stop PB in "NC".
ii) "NO" type of limit switches.

9. a) Explain any two "DCS" displays with its significance and features. **8**

b) Write a note on HART communication protocol. **8**

OR

10. a) Write a note on "fieldbus standards". **8**

b) Compare PLC, SCADA & DCS. **8**

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